"Linking Venus"

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Between

"Linking Venus" New Technologies of Memory and Reconfiguration of Space at the Warburg Library

Emanuela Patti and François Quiviger

Introduction

The Hamburg art historian Aby Warburg's (1866-1929) idea of *Kulturwissenschaft* lends itself to interesting reflections in the context of what, in digital humanities, we call today the technology of linking and the visualization of complex systems (Manovich 2009 and 2012; Lima 2011). Numerous are the affinities between Warburg's method of work and the visual developments of semantic web, starting from the idea of connecting discrete areas. The physical configuration of the Warburg Library – the largest collection in the world focused on Renaissance studies and the history of the classical tradition – is based in fact on a structure allowing a rhizomatic model of conceptual and iconographic interconnection among cultural materials, rather than traditional categories and systems of classification. Similarly, the model of map-rhizome is at the basis of his last project, the *Mnemosyne Atlas*, which applied the technique of "montage-collision" of images (Didi-Huberman-Michaud 2007), proving that the "atlas" is the best representational form to emphasize iconological patterns throughout history. This blew up the sequential narrative of the bookish kind of logic encouraging a method of visual mapping. Both the Library and the *Mnemosyne Atlas* strongly rely on «contact, and movement, between different milieus, and registers, between areas that are usually

thought of as distinct and discrete» (O' Sullivan 2006: 17). Interestingly, the mapping between discrete data and a visual representation is precisely the aim of "information visualization" or *infovis* (Manovich 2009a).[1] The affinity between Warburg's method of work and recent forms of visualization of cultural data suggests then that digital technologies could enhance the resources of the Warburg Library in ways that could not only reflect but also expand the original plan of his founder. Yet, recent projects of digital classification at the Warburg Library such as *Gods and Myths* have demonstrated that while numerous are the benefits of digitalization, numerous are also the challenges – in the first place, that of finding the right compromise between Aby Warburg's original plan of classification and the new possibilities offered by digital technology.

Based on these assumptions, this article will concern the potential reconfiguration, or "remapping", of the Warburg's Library resources in the digital environment, in order to suggest further developments of the existing digital resources. The main questions we will address are, first, how the "narrative space" of the Library can be "remediated" (Bolter and Grusin 2001) through new techniques of visualization, and, second, how Linked Data and new techniques of visualization can support, and hopefully augment, Warburg's methodology in cultural history.[2] Precisely because of the affinity between the "atlas" – as both a

[1] Cfr. Lev Manovich, "What is visualisation?" (2011: 37): «What is information visualization? Despite the growing popularity of infovis (a common abbreviation for "information visualization"), it is not so easy to come up with a definition which would work for all kinds of *infovis* projects being created today, and at the same would clearly separate it from other related field such as scientific visualization and information design. Let's define information visualization as a mapping between discrete data and a visual representation».

[2] The term "Linked Data" refers to a series of best practices for publishing and connecting structured data on the Web. For further information, see Bizer, Christian – Heath, Tom – Berners-Lee, Tim, "Linked Data: the story so far" (2011), 205-227.

paradigm of the knowledge process and an early technique of visualization – and recent mapping of data, this endeavor stands out as a challenging, yet extremely fascinating goal. The article will concentrate on the specific case study of a mythological figure, *Venus*, by looking at how the potential links existing in the four sections of the Library classification (Image, Word, Orientation and Action on the theme of "Venus") can be translated into digital visualization, their potential for further development and what impact they have on the process of knowledge production and scholarly training. This case study is based on a project in progress currently developed by one of the authors, François Quiviger, for the Warburg Institute Library. Far from the ambition of being exhaustive, this article aims to simply lay the ground for further investigation on how Aby Warburg's idea of cultural history can be augmented through digital technology to answer the needs of a changing research environment.

Cultural complexity and digital humanities: Possibilities and challenges for the Warburg Library

> Visualization is ready to be a mass medium
>
> Fernanda B. Viégas and Martin Wattenberg, *Interview for infosthetics.com*

The visualization of large collections of "big cultural data" has been one of the main goals set by researchers in digital humanities.[3] We are dealing today with billions of images, texts, videos, designs,

[3] As Manovich clarifies in his seminal article "What is visualization?", «The meanings of the word "visualize" include 'make visible' and 'make a mental image.' This implies that until we 'visualize' something, this 'something' does not have a visual form. It becomes an image through a process of visualization» (Manovich 2011: 44).

photographs available on the Internet, but they are often in isolation. Still, we know that «any reflection on culture begins with an informal comparison between multiple objects in order to understand their similarities and differences» (Manovich 2011). In cultural history the main question is then, how can we compare all such information, identifying correlations, patterns, long-term interactions? Data management tools, comparative mathematical models, charts and schematic flows are just some of the possibilities offered today by new technologies to deal with complex systems of cultural data. However, as Lev Manovich has highlighted in his article "Museum without Walls, Art History Without Names: Visualization Methods for Humanities and Media Studies" (2012), in the first decade of the 21st century projects in digital humanities mainly focused on either textual data, such as literature, historical records or social media, or spatial data, such as locations of people, places and events. In other words, visual media remained outside of the computational paradigm. In more recent years, new techniques of visualization have been developed with impressive results: using software, we can visualize much larger data sets, create animated visualization, show how processes unfold in time, compare images and texts and, even, manipulate visualizations interactively. Not only can we express data visually, but we can also discover unknown patterns and connections between texts, images, photographs, and so on. Employing new techniques of visualization to identify similarities, differences and emerging patterns in cultural data could therefore radically change the way we conceive the representation of cultural history.

The objectives illustrated above seem to be very much in tune with Warburg's concept of *Kulturwissenschaft* that was indeed based on the idea of recognition, through associations, of patterns in the context of flow, evolution, complexity, heterogeneity, and cultural hybridity. With this in mind, the spatial configuration of the Library resources was conceived as to *suggest*, through physical proximity, connections between cultural materials. It was then up to the scholar to explore that "narrative space" and make these connections "visible". However,

Warburg's ideal of classification faced a number of constraints in the paper format. To mention just a few of them: in the classification of images, the cross-referenced classification of a photograph requires more duplicates; also, whilst exploring the Library, scholars are exposed to either the chronological and topographical classification of materials, or, as in the case of images, to the iconographic one. In brief, although Warburg's original plan of classification had the merit to break traditional systems following disciplinary or alphabetical orders, still the paper format did not allow the full experience of the "narrative space" of his Library. Finally, the representation of cultural patterns seemed to be another big challenge of Warburg's: the limits of the written language and of the linear form of traditional writing are, in fact, implied in the choice of the map-rhizome form of the *Atlas*. This leads to the question, to what extent should the *Mnemosyne Atlas* be considered as an early form of visualization?[4]

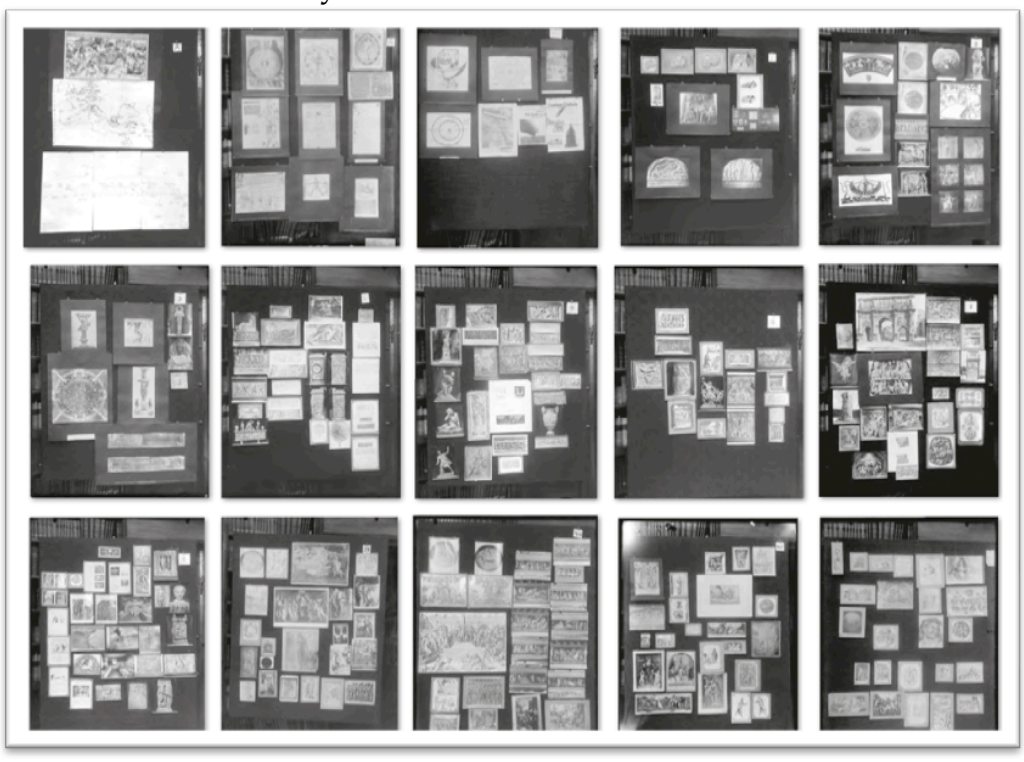


Figure 1: 12 plates from the *Mnemosyne Atlas* (copyright Warburg Institute)

[4] For a general introduction about the *Atlas* see http://warburg.library.cornell.edu/ (last accessed 7 May 2015).

Arguably, Linked Data and new techniques of visualization can be applied to the very rich and complex set of "big cultural data" of the Warburg Institute Library. It is clear that the potential of visualization goes far beyond the project of digitising the rich collection of the Library to simply make it more easily accessible for scholars visiting the Institute and worldwide. In fact, digital technologies are likely to enhance Aby Warburg's method of work in a way that physical space of the Library and paper format did not allow, therefore augmenting the possibilities of creating links between cultural materials. Recent digital projects such as the *Gods and Myths* digital collection of the Library have started some work in this direction. The iconographic database that has been created shows the visual traditions of the ancient gods across media, chronologically and by iconographic types from antiquity to modern times. In this way, a single keyword search makes it possible to lay out 25 centuries of mythological imagery. But how can we visualize the spatial arrangements of other relevant Library materials on gods and myths? And, to what extent could we expand the cross-referencing between materials, in order to visualize the complex patterns of relations existing in the Library? The rhizomatic model underpinning the Warburg Institute Library offers interesting insights in this direction.

The rhizomatic model at the Warburg Institute Library

> In a book, as in all things, there are lines of articulation or segmentarity, strata and territories; but also lines of flight, movements of deterritorialization and destratification…All this, lines and measurable speeds, constitutes an assemblage. A book is an assemblage of this kind, and as such is unattributable. It is a multiplicity […]. We will never ask what a book means, as signified or signifier; we will not look for anything to understand it. We will ask what is functions with, in connection with what other things it does or it does not transmit intensities, in which other multiplicities its own are inserted metamorphosed, and with what bodies without organs it makes its own converge.
>
> Gilles Deleuze and Félix Guattari,
> *A Thousand Plateaus: Capitalism and Schizofrenia*

Anyone familiar with the Warburg Institute in London knows that the Library follows a unique classification. Unlike most libraries' cataloguing systems organized by subject matter, alphabetical and, then, numerical order, the 350,000 volumes of this collection are classified under four categories: Image, Word, Orientation, and Action, arranged over the four floors. The Warburg Institute Library was initially set up to support Warburg's research. Two core aspects of the Library classification echo his broad interests. Warburg was interested in the circulation of ideas across time and space, and in the transition from primitive to contemporary humanity. Thus, in his Library books are organized chronologically and topographically, rather than in

alphabetical order. This means that browsing the shelves amounts to browsing the development and changes in most disciplines from Antiquity to modern times across time but also across space. In the art historical sections, for instance, books are arranged by countries – Italy, France, Spain, etc. – but within each country the sequence is based on the date of death of the artists. Very much in the same spirit of understanding how the passage of time has affected the slow transition from early systems of beliefs to present-day science, modern disciplines are placed next to their pre-modern ancestors. Alchemy, for example, features next to Chemistry; Magic is the neighbour of Natural Science and Astrology leans against astronomy. The section on mathematics includes Euclid but also texts on magic square, magic numbers and mathematical games.[5]

At a broader level, the classification encapsulates the aim of the Library: to represent the tenacity of symbols and images in European art and architecture (Image section, 1st floor); the persistence of motifs and forms in Western languages and literatures (Word section, 2nd floor); the gradual transition, in Western thought, from magical beliefs to religion, science and philosophy (Orientation section, 3rd and 4th floor) and the survival and transformation of ancient patterns in social customs and political institutions (Action section, 4th floor). In other words the Library was organized to lead from the visual image, as the first stage in human's awareness (Image), to language (Word) and then to religion, science and philosophy, all of them products of humanity's search for Orientation which influences patterns of behaviour and actions, the subject matter of history (Action). This system can be browsed in a linear way, but, as we shall see below, it can also be used transversally.

This unusual classification system was established by Aby Warburg himself and his assistant Fritz Saxl – later extended and reorganized by three generations of scholar librarians – following what has been described by Saxl as the «good neighbour law» (Gombrich

[5] See http://warburg.sas.ac.uk/Library/maps/orientation-3rd-4th-floor/#c1008 (last accessed 7 May 2015).

1986: 327). Kurt Forster, in his introduction to the 1999 translation of Warburg's collected works, has defined this as the method «to display the contents of the collective memory archive in a systematic spatial arrangement» (Forster 1999: 52). As a consequence, his classification system was organized in patterns recognition based on conceptual interconnections and cultural convergence that he frequently rearranged. As Ernst H. Gombrich clarifies in his *Aby Warburg: An Intellectual Biography* (1986), for Warburg books were more than instruments of research. Assembled and grouped, they expressed the thought of mankind in its constant and its changing aspects. On the other hand, this classification was thought to allow researchers to move freely in the space of the Library, following, in Bergsonian terms, their intuition as a "true method". Thus, in this sort of three-dimensional experience of the Library, such associations were supposed to lead each reader to multiple, and different, signifying practices, intuitive associations and experimental patterns.

The arrangement of the books makes even daily movements significant. Crossing sections of the Library to reach another part of the building is in itself an intellectual flight across entire provinces of cultural history. The fact that large size or oversized books are shelved along the main passageways emphasizes this phenomenon. These, with their broad spines of various materials and color, provide a summary of the contents of each floor. Walking to the photographic archive, located at the opposite side of the building, cuts across an alley bordered by spines synthesizing twenty centuries of European art. Anyone wishing to reach the staff, fellows and students rooms on the 2nd floor will be greeted on the left by in-folio witnesses of Western literature from Homer to Dante, Petrarch, Boccaccio, Erasmus, Shakespeare and Goethe followed by mythological compendia, and samples of the section on pictorial symbols – including Renaissance hieroglyphics, emblems, heraldic devices, coins, medals, post stamps, printer devices and *ex-libris* – all carriers of texts and images across time. On the right-hand side large size books summarize the last sequence of the floor surveying the history of the transmission of knowledge from encyclopaedias to world chronicles, expanding to the

history of the book, of libraries, of education, from school to Universities, and finally of travels and cultural exchanges. Whoever needs to reach the office of the Director and the Secretariat must pass through the history of religions, theology and philosophy. On the 4th floor the accounts of festivals, magic, science and political history border the path leading to the archive. Thus, when applied to the paper media the Warburg classification transforms even a short walk into a flight over cultural history.

As the opening quote of this section suggests, Warburg's concept of *Kulturwissenschaft* – implied in the notion of "good neighbour" for books and images and then reflected, at a macro level, in the cultural space of the Library – presents a number of similarities with Deleuze and Guattari's "rhizomatic model" of culture. As we can read in *A Thousand Plateaus: Capitalism and Schizofrenia*:

> In contrast to centered systems with hierarchical modes of communication and pre-established paths, the rhizome is an acentered, nonhierarchical, nonsignifying system without a General and without an organizing memory or central automaton, defined solely by a circulation of states. Distinct from a tree topology and its individual branches, the rhizome connects any point to any other point, in a transverse and autonomous way, allowing for a flexible network of intercommunicability to emerge. The rhizome pertains to a map that must be produced, constructed, a map that is always detachable, connectable, reversible, modifiable, and has multiple entryways and exits and its own lines of flight. The rhizome operates by variations, expansion, conquest, capture, offshoots. …unlike tracings, the rhizome pertains to a map that must be produced, constructed. (Deleuze - Guattari 1987: 21)

The map-rhizome, then, best represents cultural history as a network of complex interconnections within cultural production. Indeed, map formats do not aim to create closed and exhausting systems of knowledge, but they rather intend to expose significant interconnections between heterogeneous cultural materials. Hence, as a

model for culture, the rhizome resists the organizational linear structure of the root-tree system and ceaselessly establishes connections between semiotic chains. The erratic and problematic nature of these associations is therefore left open to continuous reconfiguration.

Various scholars have explored the matrix of the rhizomatic model in Warburg's approach to culture (see, for example, O' Sullivan 2006), but particularly significant is Georges Didi-Huberman's extensive work on Warburg's concept of "atlas". As it emerges especially in *Atlas, ou, Le gai savoir inquiet* (2011), this notion is used to signify a form of knowledge, or we should rather say, an idea of cultural history. The "atlas", which here indicates both the knowledge process and the representation of knowledge, does not have a definite form. Even if its montage suggests some significant associations, it allows multiple entries. In other words, it disrupts rational models of intelligibility based on the relationship between things (*Sachen*) and causes (*Ursachen*), opening up possibilities to explore what is left out of these equations. By challenging "epistemic purity", the "atlas" introduces the multiplicity, difference, and hybridity of the montage in the knowledge process (Didi-Huberman 2011). It deconstructs ideas, as well as ideals of uniqueness, specificity, purity, and integral knowledge. These thoughts are well exemplified by the French art historian in his introduction to the exhibition *Atlas* (2011) at the Museo Nacional Centro de Arte Reina Sofia in Madrid. Here Warburg's concept of "atlas" is intended as a visual and synoptic form of knowledge which implied constant reconfiguration of its "narrative space", following new analogies, new trajectories of thought.

The rhizomatic model implicit in Warburg's concept of cultural history finds today one of its best expression in the hypertext, «the largest rhizomatic system ever created by man» (Lima 2001: 44). As a hyper-structured text with hyperlinks or other structures embedded inside a page, the hypertext overcomes the previous linear constraints and logics of written texts. It allows multiple connections between media texts, therefore creating a «flexible network of intercommunicability to emerge» (Deleuze - Guattari 1987: 21).

Connecting materials, or data, is, however, not the answer. Understanding *how* to best use the Web to create links between data from different sources is the one, and this is precisely the purpose of Linked Data and of the semantic web. *How* to visualize them is then the objective of visualization methods.

In the actual digital resources of the Warburg Institute the possibilities offered by Linked Data and visualization have only been partly explored. For example, in order to illustrate the variety of materials which can be gathered around a theme, the Warburg Library website proposes short guides to the collections, derived from displays exploring topics such as the perceptual category of colour, the concept of self and the expressive theme of laughter.[6] Preparing small-scale displays is also part of the duties of librarians. One of the most recent projects is *Laughter*, a display of laughing matters following the classification of the Warburg Library (22 July-30 September 2014).[7] However, these displays target the more specific purpose of showing how intersecting a specific theme with Warburg's classification system amounts to revealing the main outlines of its multidisciplinary cultural histories. While setting up guides around broad themes is a relatively straightforward matter, things get a little more complicated when focusing on the presence of mythological figures in the Library classification. Here we encounter far more possibilities of multi-layering and cross-linking. In the next section, we will then explore how this could be achieved in a more extended way, focusing on the case study of Venus.

[6] http://warburg.sas.ac.uk/Library/guides/ (last accessed 7 May 2015).

[7] http://warburg.sas.ac.uk/library/guides/laughter/ (last accessed 7 May 2015).

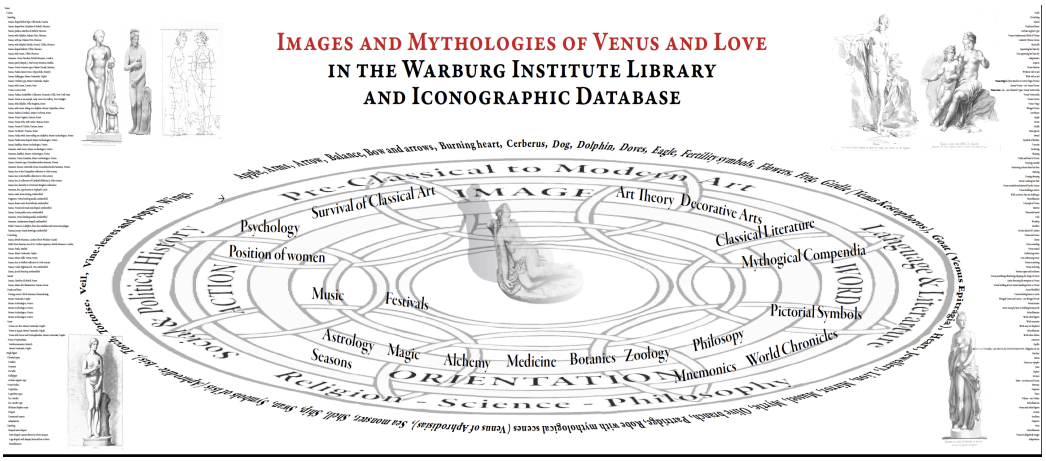
"Linking Venus"
Remapping the "narrative space"
of the Warburg Library

The "Linking Venus" project had two initial objectives: first, linking relevant data on the figure of Venus existing in the Warburg Institute Library, including the Iconographic Collection; second, providing a visual mapping of such connections or, more precisely, a remapping of the classification originally conceived by Warburg in the physical space of the Library. In general terms, the visualization method follows two steps: first, collecting the data and then, figuring out the best way to display these data so that the relationships and patterns in it may become visible (Manovich 2012). In this section we will invert this order and show first the visual mapping that has been created to provide a sort of "distant reading" (Moretti 2013) of the variety of manifestations of Venus in European cultural history, as revealed by the Warburg classification system. From prehistoric female figurines later named 'Venus' by scholars to Polanski's evocation of *Venus in Fur*, this mythological figure has been the carrier of Western thought on love and desire.

At a practical level we are dealing with three interlinked layers: the iconographic tradition – here based on a corpus of over three thousand images accessible in the Warburg Iconographic database; Venus as a mythological figure in the different subject areas of the Library; and the attributes of Venus in the Library classification.

The three layers have been represented as in the graphic below:[8]

[8] For a high-resolution version see http://warburg.sas.ac.uk/mnemosyne/Venus_kbw.pdf (last accessed 7 May 2015), p. 1.



The iconographic tradition can be examined online in the iconographic database of the Warburg Institute, the digital version of the collection of photographs initially assembled by Warburg and expanded by several generations of curators.[9]

At the time of writing the open access database holds over 3300 images of Venus, encompassing the entire visual tradition from antiquity to the present. These images are arranged by iconographic types, but can also be examined chronologically by means of a simple keyword search.

As for Venus in the Warburg Library, the graphic above sets side by side the typological organisation of the iconographic database and the Library classification. The latter is represented as a giant pavement featuring the principal sections containing material related to Venus. Bordering the outer circle are the attributes of Venus that in turn link to further sections of the Library. We can now briefly examine the presence of Venus in the Library.

[9] http://warburg.sas.ac.uk/photographic-collection/iconographic-database/ (last accessed 7 May 2015).

IMAGE
Ancient to Modern Art (1st floor)[10]

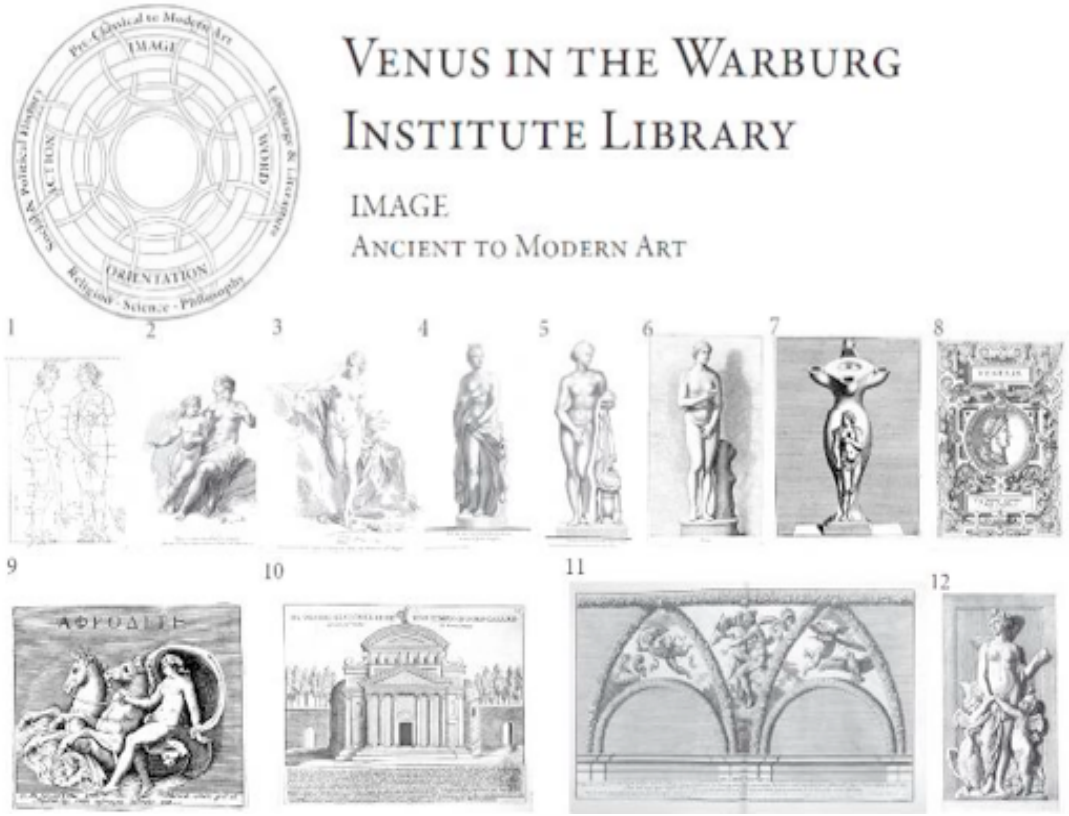


Plate 1

The first section of the Library merely backs up the iconographic tradition by means of books and essays related to representations of Venus from pre-historical figurines to the Greek Aphrodite, the Roman Venus and its early modern adaptations in European arts. These include effigies of Venus in sections such as Classical Iconography, Survival of Classical art – including Medals, Coins, Cameos, Oil lamps, Sculpture, and Architecture. Artistic education from the Renaissance to the 19th century was based on the study of antique sculpture. Thus images of Venus were considered models of feminine beauty, and feature in didactic literature addressed to aspiring artists.

[10] For a high-resolution version see http://warburg.sas.ac.uk/mnemosyne/Venus_kbw.pdf (last accessed 7 May 2015), p. 2. Captions see at the end of this article.

WORD

Language, Literature, Survival of Classical Literature (2nd floor)[11]

Plate 2

The Image section, on the first floor of the Library, deals with the history of the representation of Venus. On the second floor, the section entitled Word, provides an overview of Venus in Classical and post-Classical literature. These include a large collection of early modern illustrated editions of classical texts – in particular Ovid's *Metamorphoses*. Furthermore, a collection of mythological dictionaries, compiling the principal texts from the antiquity to the present, opens a large section on the circulation of classical themes and legends in the Middle Ages and the Renaissance. In the following section, Pictorial Symbols, Venus is not only a character and a mythological figure but also a symbol of love and lust featuring in early modern emblems,

[11] For a high-resolution version see http://warburg.sas.ac.uk/mnemosyne/Venus_kbw.pdf, (last access 7 May 2015), p. 4.

proverbs, printer devices, *ex-libris* and even postal stamps. The last section of this floor documents the history and transmission of knowledge, including Encyclopaedias and World Chronicles, where according to the euhemerist tradition Venus is characterized as an ancient deified queen.

ORIENTATION

Religion, Science, Philosophy (3rd and 4th floor)[12]

Plate 3

This section unveils the transformation of Venus from Religion to Philosophy. The section on the Religions of the Graeco-Roman world deals with her various cults. In philosophy she features in many texts, from the opening lines of Lucretius' *De rerum natura* to Platonic and Neo-Platonic discussions of love by Renaissance philosophers such as

[12] For a high-resolution version see http://warburg.sas.ac.uk/mnemosyne/Venus_kbw.pdf, (last accessed 7 May 2015), p. 5.

Marsilio Ficino and Leone Ebreo. Christians kept the Pagan names of planets, and consequently preserved the appearance of ancient gods in the pre-modern sky. Thus Astrology is the main channel through which Venus survived the transition from the ancient to the medieval world. Here she features as one of the seven planets in astrological literature and also in calendars, almanacs and even booklets on the Children of Planets that describe the characteristics of those born under her sign. In the section on Magic Venus can be seen on talismans, namely images intended to channel her planetary energy on propitious days. She is also the energy that binds metals in Alchemy. Geography discusses her birthplace as Cyprus; Medicine associates her name to sexually contracted diseases and uses her features for anatomical models. Even the mapping of the hand in chiromancy includes a finger of Venus (the small finger) – and a mount of Venus.

ACTION
Social and Political History (4th floor) [13]

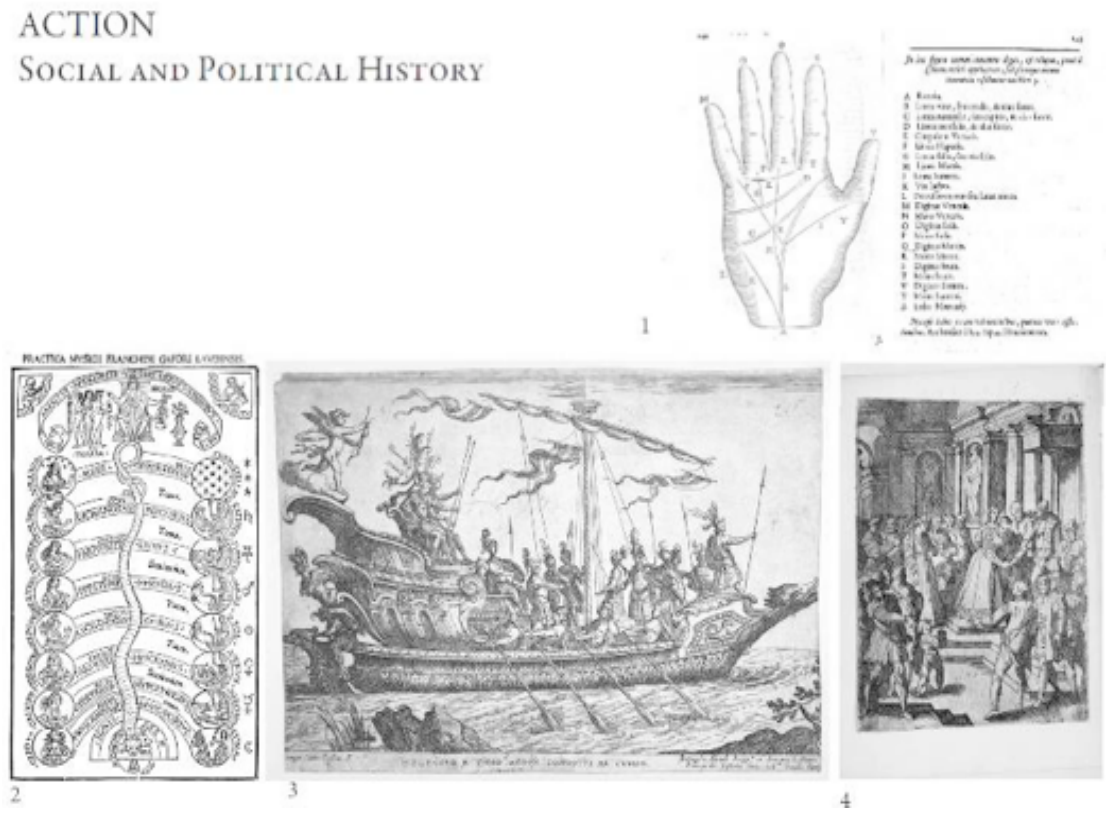


Plate 4

In this part of the Library we encounter Venus in Literature on Women, as an ideal, a model or a point of reference in matters of seduction, sex, marital life and prostitution. The section on Music includes theoretical elaborations on the harmony of the spheres – of which Venus is one – as well as opera libretti setting the goddess on the stage. Similarly, in the section on festivals and festive culture, Venus is a familiar presence in pageants and banquets celebrating dynastic weddings. Sometimes humans play her role, other times she features as a statue of *papier maché*, wood or cast sugar. The last section, political history, might not at first seem particularly relevant to our

[13] For a high-resolution version see http://warburg.sas.ac.uk/mnemosyne/Venus_kbw.pdf, (last accessed 7 May 2015), p. 6.

theme, if not that most European dynasties had their ancestors retraced to the legend of Troy. Venus is in fact central to Roman history, as she is the mother of Aeneas, the mythical founder of Rome.

More links

This combinatory exercise, between one mythological figure and the various disciplines represented in the Library rises exponentially if we extend it to the multiple attributes of Venus. The principal are: apple, arms, arrow, balance, bow and arrows, burning heart, Cerberus, dog, dolphin, doves, eagle, fertility symbols, flowers, frog, girdle (Venus Kestophoros), goat (Venus Epitragia), heart, jewellery, lion, mirror, mussel, myrtle, olive branch, partridge, robe with mythological scenes (Venus of Aphrodisias), sea monster, shell, ship, swan, symbols of Isis (Aphrodite-Isis), torch, tortoise, veil, vine-leaves and poppy, wings. Each attribute can be linked to further sections of the Library. For example, the rose is an attribute of Venus but also of her antithesis, the Virgin Mary. It features in many sections of the Library, from Still-Life to Literature, Emblems, Botany, Perfumery, Gardening, Banqueting and Festivals, to list the most obvious. The potential for visualising intersections between one subject and another are considerable.

As it stands, the project has allowed a basic rapid visualization – namely a "distant reading" (Moretti 2013) – of all the textual and iconographical resources on Venus available at the Warburg Library. This could be replicated for other themes, but it could also be used at an even more sophisticated level to compare texts and images, to project time into space, to visualize temporal changes. Basically, it could extend Warburg's method of work beyond the limits of the paper format. Creating links between cultural artefacts is just the first step to make the semantic interconnections between all these resources "visible"; it is the way to translate them into data that could enormously increase the possibilities to explore patterns. This is usually the job of a visualization designer; however, the input of the

humanities scholar is crucial to understand how to do it, precisely because it is in fact a translation of media texts/artefacts such as books, photographs, films, cartoons, visual arts, films, etc. into significant data that capture their content, form and use. Techniques of visualization are not standardized and in many cases they have to be invented and theorized. Hence, the first question to be answered is, which "data" are relevant in the case of the cultural artefacts of the Warburg Library?

Conclusion: what's next?

There are still numerous questions to be answered. They mainly concern the practical ways in which to translate Warburg's idea of cultural history into techniques of visualization. The arrangement of the sections of the Warburg Library certainly encourages intuitive connections between fields of knowledge. It also lends itself to combinatory exercises, as illustrated above, revealing the presence of ideas and themes in Western cultural history. This approach is particularly compatible with the direction currently taken by digital humanities under the impulse of the semantic web – and in particular of Linked Data. Each element, such as an individual, or in the case study described a mythological figure, is represented by its "attributes" – also called "properties" or "features". Each attribute corresponds to a tag that can be connected to similar tags. Applying these methods to the growing electronic resources of the Warburg collections is the plan of the forthcoming years and amounts to setting up the infrastructure for a transdisciplinary mapping of knowledge.

Unlike the *Mnemosyne* Atlas, which is the outcome of a selection of images, the Library provides raw material organised thematically and chronologically across categories expressing Warburg's ambition of setting up a "historical psychology of Humanity" (Gombrich 1986). This can set the groundwork for mapping the multiple paths of Western cultural history. The foundations are there since the contents of the Library is of course accessible through the indispensable standard facilities of an electronic catalogue. Yet a next step would be

to visualise all these data through the Library and the iconographic database classification.

Linked Data currently serves fields such as economics, politics, science, social life and social media. It applies to human activities producing data to be analysed without the aid of computers. Adapting these models to the Warburg classification system in order to display big cultural data amounts, in computing terms, to setting up the means by which the result of any search on a given theme, subject or person, would produce and display a map of its cultural history across disciplines and across media.

Finally, by exposing links and relations between things, beings and ideas across time and space Warburg's classification is in itself a research tool that encourages researchers to work in a transdiciplinary way. [14] By encouraging a networking model of physical, emotional and conceptual exploration of the books, the organization of Warburg's Library clearly challenged standardized disciplinary boundaries. Warburg was in fact interested in the history of culture, in its psychological and social contexts, and in their respective impact on artists and on the development of styles. Similarly, his atlas model was not made for definitely classifying, for exhaustingly making an inventory, or for cataloguing once and for all as in an archive, but instead for gathering segments, or parcelling out the world, while respecting its multiplicity and its heterogeneity, and for giving a legibility to the underlying relations (Didi-Huberman 2011). Indeed, cultural history, including all histories of art, is an anthology of samples that, over the years, have become emblematic of their time. Applying computing tools to the analysis of large quantities of texts

[14] As Basarab Nicolescu highlights in the introduction to his *Manifesto of Transdisciplinarity* (2002), transdisciplinarity (across and beyond all disciplines) is in fact different from both "interdisciplinarity" (applying the methods from one discipline to another) and "multidisciplinarity" (teams from various disciplines combining to investigate a research question) (Nicolescu 2002: 1).

and images may allow more patterning, more contextualisation and provide more ground to assert broad ideas.

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Plate 1: Venus in IMAGE:

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Plate 2: Venus in WORD:

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Plate 4: Venus in ACTION:

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